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| --- | --- | --- | --- | --- | --- | --- |
|  | FAST Approaches to Scalable Similarity-based Test Case Prioritization | Scalable Approaches for Test Suite Reduction | QTEP : Quality-Aware Test Case prioritization | Optimizing Test Prioritization via Test Distribution Analysis | Assessing Test Case prioritization on Real Faults and Mutants. |  |
| Publishing | 2018 ICSE | 2019 ICSE | ESEC/FSE 2017 | ESEC/FSE 2018 | ICSME 2018 |  |
| Objective | Process prioritization of the big test suite | Reduction test suite. | find code fault-prone for information to prioritize test cases. | To achieve the optimal prioritization effectiveness for any given project in practice. Learning based Predictive Test Prioritization. | investigated correlation between mutants and real faults |  |
| Approaches | Evaluating similarity(jaccard similarity) and choice the next test case | Euclidean distance. | Gives more weight to fault-prone source code with two code inspection approaches(static bug finders, defect prediction models) | PTP builds a predictive model via XGBoost by collecting three groups of features(distribution of test coverage, testing time, and coverage per time unit) on existing projects and labeling which prioritization technique performs optimal on the training data | create one mutated program instance by seeding a randomly selected mutant into the latest corresponding program version, and then repeat this process 100 times. |  |
| Techniques | Shingles, minhash,locality sensitive hashing | K means++, random projection, clustering. |  | In the training process, PTP collects the test distribution features and label information(e.g., which prioritization technique performs optimal) for each training project, and performs feature normalization and over-sampling to build the predictive model. |  |  |
| Evaluation metrics | APFD, Preparation and prioritization time | Fault detection loss, Test suite reduction. | APFD |  | APFD and APFDc |  |
| Strength | Effectiveness,efficiency(total time and preparation time each) in terms of bigger test | Preparation time and Prepared data time is lower than above paper. | Can check more suspicious method and get Improvement testing efficiency | result from practical testing infrastructure for Baidu(industrial subjects) | explain correlation between mutant and real fault in terms of empirical study with test prioritization. |  |
| Weakness | Large preparation time trade off precision and time cost.  Using similar projects may have bias. | de facto standard metrics, | Research effectiveness may vary using other techniques. APFD can`t reflect time and space cost or the severity. | use the mutation faults. Mutation threat. | Different affects from mutants seeded in the same code from the real fault. This result are representative of a certain set of mutants. |  |

Prioritization techniques.

Greedy techniques(total and Additional)

Adaptive Random Testing(similarity distance)

Genetic Algorithm-based Technique

Call-graph-based(Total and Additional)

* Most prioritization paper consider severity as same value for difficulty of measurement.
* APFDc is more precise in case of real scenario but not perfect
* Lack of total time cost consideration.
* Almost do not consider first test execution.

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APFDc

Incorporating Varying Test Costs and Fault Severities into Test Case Prioritization (ICSE2001)

* Suggest APFDc for the first time.